

**School of Dynamic Systems
COLLEGE OF ENGINEERING AND APPLIED SCIENCE**

**SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN**

APPLICATION DEADLINE: March 1, 2012

The School of Dynamic Systems is pleased to offer the following research project for the summer of 2012. Interested students are urged to contact the faculty member(s) directing the project that most interests them. By contacting the faculty member, you can discover more about the project, learn what your responsibilities will be and, if possible, develop a timetable for the twelve-week research period.

PROJECT TITLE: Vibration Assisted Nano Abrasive Machining Process

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Project Description

Nanoscale machining in general refers to ultraprecision machining of at least one dimension of the part lesser than 100 nm. Nanotechnology products have the potential to offer better quality, reliability and higher performance. We are currently exploring the possibilities of using vibration-assisted nano abrasive machining process for machining wide range of materials with ultraprecision accuracy by applying the principles of ultrasonic vibration and abrasive machining to achieve a vibration assisted target specific nano abrasive machining process using an atomic force microscope (AFM). The process is conducted experimentally on an AFM modified to suit the machining and the process simulation studies are done using Molecular Dynamics (MD) simulation software.

Learning Opportunities for student

The research is spread over multiple disciplines and hence presents tremendous opportunity for undergraduates to be exposed to interdisciplinary research. The project will help student familiarize with the application of Atomic Force Microscope as a machining as well as metrological tool. The system development and experimentation involved will provide hands-on experience in research. In addition, the students can gain experience with the cutting edge technology of Molecular Dynamics (MD) Simulation and its applications to understand nano machining problems.